REMARKS

A. Art of Record Does Not Render Claims 1-12 Unpatentable

The Applicants entity (hereinafter "Applicant") Applicant respectfully shows, below, that the art of record does not show or suggest certain express recitations of Applicant's **herein-amended** Claims 1-12. Accordingly, Applicant respectfully asks that the Examiner allow Claims 1-12 over the art of record.

1. Independent Claim 1

a. Recitations of Independent Claim 1

Applicant's Independent Claim 1 currently recites "[a] system comprising: one or more aperture-ingress-side surfaces; one or more aperture-egress-side surfaces; and **substantially all of said one or more aperture-ingress-side surfaces positioned** such that light originating external to at least one of the one or more aperture-ingress-side surfaces is either

allowed to enter an aperture ingress or is **substantially reflected in a direction such that re-reflection through the aperture ingress is substantially minimized, wherein said one or more aperture-ingress-side surfaces comprise: one or more curved surfaces.**"

Applicant respectfully suggests that the art of record, cited by the Examiner, does not show or suggest the foregoing recitations of independent Claim 1 (especially the foregoing italicized portions of Applicant's Claim 1).

b. Art of Record Identified by the Examiner Does Not Render Claim 1 Unpatentable

The Examiner has rejected Claim 1 as anticipated by U.S. Patent 5,161,238 to Mehmke (hereinafter "Mehmke"). *See Examiner's Office Action* p. 2 (29 January 2003). In response to the Examiner, Applicant has herein amended Claim 1 to include the recitations of dependent Claim 4, and has cancelled dependent Claim 4. Consequently, Applicant respectfully points out that, as has been recognized by the Examiner, U.S. Patent 5,161,238 to Mehmke does not show or suggest at least the foregoing-bolded "**wherein said one or more aperture-ingress-side surfaces comprise: one or more curved surfaces**" recitations of Claim 1. *See Examiner's Office Action* p. 2 (29 January 2003).

The Examiner has rejected dependent Claim 4, whose recitations have been herein added by amendment to independent Claim 1, as anticipated by U.S. Patent 5,016,995 to Pullen (hereinafter "Pullen"). In response to the Examiner, Applicant has herein amended Claim 1 to now recite "**substantially all of said one or more aperture-ingress-side surfaces positioned such that** light originating external to at least one of the one or more aperture-ingress-side surfaces is either allowed to enter an aperture ingress or is **substantially reflected in a direction such that re-reflection through the aperture ingress is substantially minimized, wherein said one or more aperture-ingress-side surfaces comprise: one or more curved surfaces.**" Applicant points out that the teachings of Pullen do not meet at least the foregoing-bolded recitations of Claim 1 in that Pullen is concerned with

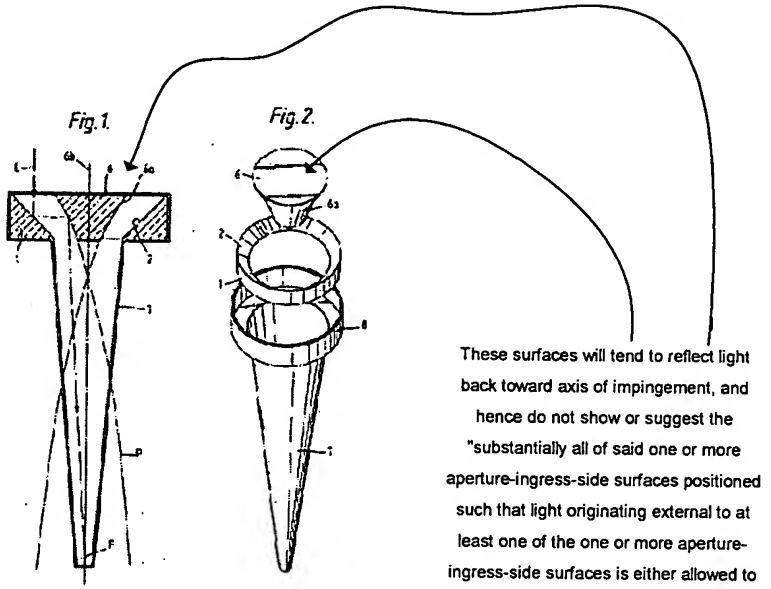
> [A]n apparatus which easily and conveniently increases the effective aperture of a focussing system having a conventional objective lens or mirror and thus increases its light gathering capacity.

> [T]he invention [of Pullen] to provide a focussing objective reflecting surface which is particularly advantageous when used in a focussing system with such an adjustable effective aperture.

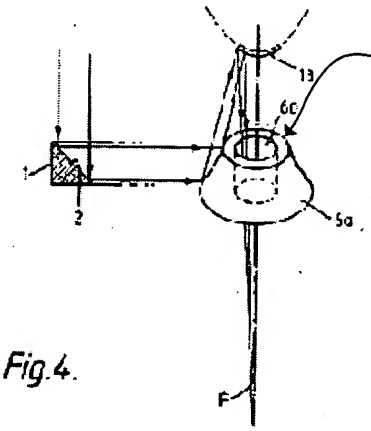
Pullen '995 Patent, Summary of the Invention, col. 2 lines 11-19. Consequently, since Pullen is concerned with focusing rather than decreasing "re-reflection **through** the aperture ingress" such as is recited in Applicant's herein-amended Claim 1, the teachings of Pullen do not meet the recitations of herein amended Claim 1.

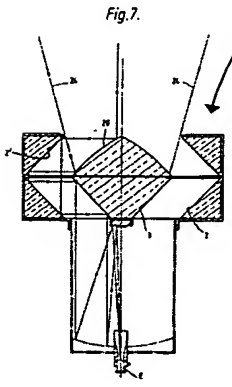
That Pullen does not teach the foregoing recitations of Applicant's Claim 1 can be seen by the following Figures 1, 2, 3, and 7 of Pullen, which Applicant has annotated to show those portions which do not meet at least the foregoing bolded claim recitations.

1, 2, 3, and 7 of Pullen



These surfaces will tend to reflect light back toward axis of impingement, and hence do not show or suggest the "substantially all of said one or more aperture-ingress-side surfaces positioned such that light originating external to at least one of the one or more aperture-ingress-side surfaces is either allowed to enter an aperture ingress or is substantially reflected in a direction such that re-reflection though the aperture ingress is substantially minimized, wherein said one or more aperture-ingress-side surfaces comprise: one or more curved surfaces" recitations of Claim 1.





In addition, although not expressly shown here, Applicant points out that the structures of Pullen's Figures 5, 6A, and 6B do not show apertures. Again, Applicant points out that Pullen's failure to show the recitations of Applicant's herein amended Claim 1 is due at least in part to the fact that Pullen is interested in better focusing rather than reducing backscatter radiation.

2. Art of Record Does Not Establish *Prima Facie* Case of Unpatentability of Dependent Claims 2-12

Claims 2-12 depend either directly or indirectly from Independent Claim 1. "A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers." 35 U.S.C. § 112, paragraph 4. Consequently, Claims 2-12 are not rendered unpatentable by the art of record for at least the reasons why Claim 1 is not rendered unpatentable by the art of record. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 2-12 for at least these reasons, and hold Claims 2-12 allowable over the art of record.

3. Dependent Claims 6 and 12 are Independently Patentable Beyond the Reasons Why Claim 1 is Patentable

Applicant's Claim 6 recites as follows: "[t]he system of Claim 1, wherein said one or more aperture-ingress-side surfaces comprise: said one or more aperture-ingress-side surfaces treated to substantially absorb light." Applicant's Claim 12 recites as follows: "[t]he system of Claim 1, further comprising: an enclosure treated to substantially absorb light."

With respect to Claims 6 and 12, the Examiner has stated that "Mehmke teaches all limitations of claims 6, 12, 18 and 20, but fails to teach of the aperture having a light absorbent coating. Lauf et al teach of a light absorbing article and also teach that light absorbing surface coatings an components are well know in the art of optical systems (column 1, lines 21-23). It would have been obvious to one of ordinary skill in the art, at the time of the instant invention, to combine the system of Mehmke with the teachings of Luaf et al to achieve an optical system wherein unwanted light is eliminated or reduced." *Examiner's Office Action*, p. 3 (29 January 2003).

Applicant respectfully points out that Mehmke teaches away from combination with Lauf to reach Claim 6. Specifically, Applicant points out that Mehmke states

BACKGROUND OF THE INVENTION

In the **prior art for confining the laser beam diaphragms are usually employed which absorb the unrequired parts of the laser beam.** The diaphragms may have various forms depending on the desired dimensions of the confined or limited laser beam. Usually, circular pinhole or rectangular slit diaphragms are employed, depending on whether the dimension of the laser beam is to be limited in one or two dimensions. Diaphragms may be arranged in the laser beam outside the laser (extracavity) or in the laser resonator (intracavity).

The known diaphragm arrangements involve however problems when the power of the laser lies in the medium or higher range, i.e. is a few Watts or more. Since the known diaphragms limit the beam by absorption of beam components the diaphragms can become very hot and assume temperatures of more than 100° C. **This heating of the diaphragms leads to a heating of the surrounding air and as a result schliere formation can occur at the edges. The density of the air changes directly at the edges of the diaphragm so that inhomogeneity of the refractive index occurs in said region and this causes the schliere formation.**

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SUMMARY OF THE INVENTION

The invention is based on the problem of providing an apparatus for **confining laser beams of medium and high power** which with simple means ensures a sharp beam boundary without interferences.

According to the invention this problem is solved in that the laser beam is confined by a diaphragm which is at least partially measured and is arranged with respect to the laser beam in such a manner that the beam portions reflected by the diaphragm are directed away from the laser beam axis. The term "directed away from" is to be taken as meaning that the reflected beam portions are removed from the laser beam. In being so they can previously intersect the beam axis.

Due to the mirroring of the diaphragm provided according to the invention a negligibly small heating up thereof or none at all takes place. The energy of the shut-out beam portions is substantially reflected, i.e. carried away from the diaphragm. The diaphragm is mirrored to such an extent that at the wavelength of the laser beam it is not absorbent or is only negligibly absorbent, i.e. absorbs only a few percent.

Since due to the good direction characteristic of the laser, the beam portions reflected by the diaphragm are likewise relatively sharply aligned, they can be

> reflected completely out of the laser beam and directed onto an absorber which is arranged at an adequate distance from the laser beam to ensure that any possible heating of the absorber cannot cause any disturbances of the laser beam.

Mehmke '238 Patent, col. 1, line 53 - col. 2, line 13 (emphasis added). Applicant points out that *Mehmke teaches mirroring its surfaces, so as to avoid heating by the medium and high power lasers*. Applicant points out that the *absorbtion* of the medium and high power *laser energy* was *a related art problem which Mehmke intended to solve* with his mirrored surface (*e.g.*, "heating of the diaphragms leads to a heating of the surrounding air and as a result schliere formation can occur at the edges.... density of the air changes directly at the edges of the diaphragm so that inhomogeneity of the refractive index occurs in said region." Col. 1, lines 34-39.). *Since absorption* of the laser energy was a *problem Mehmke was trying to solve*, *Mehmke teaches away from* coating his surfaces with *light absorbing surface coatings*, and *hence teaches away from combination with Lauf.* Accordingly, Applicant respectfully asks that the Examiner hold Claim 6 allowable over the art of record for at least the foregoing reasons.

Applicant respectfully points out that the art of record does not teach combining the teachings of Mehmke with the teachings of Lauf to reach Claim 12, but rather teaches away from such a combination. Specifically, as set forth above, Mehmke recites "the laser beam and directed onto an absorber which is arranged at an adequate distance from the laser beam to ensure that any possible heating of the absorber cannot cause any disturbances of the laser beam." (Col. 2, lines 9-13). Since Mehmke is concerned with keeping the system cool so that the index of refraction is not changed by heat, the foregoing teaches away from the "[t]he system of Claim 1, further comprising: an enclosure treated to substantially absorb light" recitations of Claim 12, since such an enclosure would serve to raise the temperature of operation of the system of Mehmke. Hence, Mehmke teaches away from the recitations of Claim 12. Accordingly, Applicant respectfully asks that the Examiner allow Claim 12 over the art of record.

B. Art of Record Does Not Establish *Prima Facie* Case of Unpatentability of Claims 13-20

1. Independent Claim 13

Applicant has herein amended Claim 13 to recite: "[a] system comprising: a low-backscatter aperture structure, **wherein said low-backscatter aperture structure has at least one surface oriented such that light rays impinging thereon are substantially reflected in a direction other than a direction from which said light rays impinged, and said at least one flat surface treated to substantially absorb light.**"

Applicant respectfully points out that while the language of Claim 13 differs from that of Claim 6, the allowability of Claim 13 will be apparent to the Examiner in light of the above discussion of Claim 6. Accordingly, Applicant respectfully asks that the Examiner hold Claim 13 allowable over the art of record.

2. Art of Record Does Not Establish *Prima Facie* Case of Unpatentability of Dependent Claims 13-20

Claims 14-20 depend either directly or indirectly from independent Claim 13. "A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers." 35 U.S.C. § 112, paragraph 4. Consequently, Claims 14-20 are not rendered unpatentable by the art of record for at least the reasons why independent Claim 13 is not rendered unpatentable by the art of record. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 14-20 for at least these reasons, and hold Claims 14-20 allowable over the art of record.

C. New Independent Claim 21 Patentable Over Art of Record

Applicant respectfully points out that new Claim 21 recites: [a] system having an optical train, said optical train comprising: a light source orientable to illuminate an aperture; one or more aperture-ingress-side surfaces; one or more aperture-egress-side surfaces; said one or more aperture-ingress-side surfaces positioned such that light originating external to at least one

of the one or more aperture-ingress-side surfaces is either allowed to enter an aperture ingress or is substantially reflected in a direction such that re-reflection **through** the aperture ingress is substantially minimized; and a detector orientable to capture light from the aperture.

Applicant respectfully points out that the art of record does not show the foregoing recitations of new independent Claim 21. Accordingly, Applicant respectfully asks that the Examiner allow new independent Claim 21 for at least that reason.

D. Conclusion

Overall, the cited references do not singly, or in any motivated combination and/or modification, teach or suggest the claimed features of the embodiments recited in the independent claims, and thus such claims are allowable. Because the remaining claims depend from allowable independent claims, and also because they include additional limitations, such claims are likewise allowable. If the undersigned attorney has overlooked a relevant teaching in any of the references, the Examiner is requested to point out specifically where such teaching may be found.

In light of the above amendments and remarks, Applicant respectfully submits that all pending claims are allowable. Applicant therefore respectfully requests that the Examiner reconsider this application and timely allow all pending claims. The Examiner is encouraged to contact Mr. Cook by telephone to discuss the above and any other distinctions between the claims and the applied references, if desired. If the Examiner notes any informalities in the claims, he is encouraged to contact Mr. Cook by telephone to expediently correct such informalities.

Patentability now established, the remainder of the rejections beyond the independent claims are rendered moot, and hence Applicant does not explicitly address such moot rejections herein. The fact that the moot rejections are not addressed herein should not be taken as an admission of any sort, and Applicant reserves the right to contest the statements in such moot rejections at a later time (including but not limited to legal assertion, factual assertions, and statements of official notice), should such become necessary.

The Commissioner is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 21-0380

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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Enclosures:
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